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Taxonomic and faunistic notes on the genus *Eurycaulus*, with descriptions of two new species from the Arabian Peninsula (Coleoptera: Tenebrionidae)

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Abstract

Contrary to Koch (1935) *E. peyerimhoffi* Reitter, 1904 is considered a synonym of *E. henoni* Fairmaire, 1897, as already proposed by Peyerimhoff (1907). A lectotype of *Eurycaulus hirsutus* (Miller, 1861) is designated. *Eurycaulus schawalleri* **n. sp.** from Oman and Saudi Arabia and *Eurycaulus lilligi* **n. sp.** from Kuwait are described and compared with *Eurycaulus hirsutus* (Miller, 1861). It is proposed to consider the subgenera *Ammotrypes* Fairmaire, 1879 (*Scleronimon* Reitter, 1904) and *Sclerenopsis* Koch, 1935 as synonyms of *Eurycaulus* Fairmaire, 1868.
Keywords: Tenebrionidae, *Eurycaulus*, new species, taxonomy, distribution.

Zusammenfassung

Wie schon von Peyerimhoff (1907) vorgeschlagen, wird, im Gegensatz zu Koch (1935), *E. peyerimhoffi* Reitter, 1904 als Synonym von *E. henoni* Fairmaire, 1897 betrachtet. Für *Eurycaulus hirsutus* (Miller, 1861) wird ein Lectotypus festgelegt. *Eurycaulus schawalleri* **n. sp.** aus dem Oman und von Saudi Arabien sowie *Eurycaulus lilligi* **n. sp.** aus Kuwait werden beschrieben und mit *Eurycaulus hirsutus* (Miller, 1861) verglichen. Es wird vorgeschlagen, die Untergattungen *Ammotrypes* Fairmaire, 1879 (*Scleronimon* Reitter, 1904) und *Sclerenopsis* Koch, 1935 als Synonyme von *Eurycaulus* Fairmaire, 1868 zu betrachten.

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1 Introduction

The distribution of the genus *Eurycaulus* Fairmaire, 1868 extends from the desert area of northern Africa via the Sinai Peninsula to Arabia, Afghanistan and Tajikistan. Type species is *Eurycaulus marmottani* Fairmaire, 1868. The genus is recorded from the Arabian Peninsula for the first time by SCHAWALLER (1993), describing *E. buettikeri* from Oman. SCHAWALLER (1993) also reported from Oman *E. hirsutus* (Miller, 1861), a species described from Egypt, and pointed out that a disjunction between the locality records from Oman and the area in Egypt exists. A comparison of the specimens from Oman with specimens of *E. hirsutus* from Egypt revealed that the specimens from Oman do not belong to *E. hirsutus*, but to an undescribed species which is found also in Saudi Arabia. For *E. hirsutus* (Miller, 1861) a lectotype is designated. Besides the description of a further species from Kuwait, data of the distribution of *E. hirsutus* and *E. henoni* Fairmaire, 1897 are given.

Acronyms of depositories

MC	Collection Dr. MICHAEL CARL, Türkenfeld
ML	Collection MARTIN LILLIG, Saarbrücken
NHMB	Naturhistorisches Museum, Basel
NHMB-F	Naturhistorisches Museum, Basel; Collection FREY
NHMW	Naturhistorisches Museum, Wien
RG	Collection Dr. ROLAND GRIMM, Tübingen
SMNS	Staatliches Museum für Naturkunde, Stuttgart
TAU	Tel Aviv University Collection
ZSM	Zoologische Staatssammlung, München

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For the gift and loan of material I thank Dr. M. BAEHR (Munich), Dr. D. BURCKHARDT (Basel), Dr. M. CARL (Türkenfeld), M. LILLIG (Saarbrücken), Dr. W. SCHAWALLER (Stuttgart), Dr. H. SCHÖNMANN (Vienna), and Dr. E. SPRECHER (Basel). Dr. K. ADLBAUER (Graz) and Dr. H. SCHÖNMANN (Vienna) searched without success the type(s) of *E. hirsutus* (Miller, 1861).

2 The species studied

2.1 *Eurycaulus henoni* Fairmaire, 1897

Material

Type material: Egypt, Ismailia, ex coll. ALFIERI, 1 cotype (NHMB-F). – Egypt, Ismailia, ex coll. THÉRY, 1 paratype (NHMB-F).

Further material: Egypt, Ismailia, ex coll. THÉRY, 5 specimens (NHMB-F). – Egypt, Ismailia, 1 specimen (NHMB-F). – Egypt, Ismailia, MARMOTTAN leg., ex coll. V. SEIDLITZ, 1 specimen (ZSM). – Egypt, Ismailia, ex coll. CLERMONT & coll. J. DANIEL, 1 specimen (ZSM). – Egypt, Ismailia, 17.IV.1933, C. KOCH leg., 1 specimen (NHMB-F). – Egypt, Sinai, II.1902, Hadjour el Rekab, PEYERIMHOFF leg., ex coll. J. DANIEL, 1 specimen (ZSM). – Egypt, Sinai, El Arish, ex coll. ALFIERI, 1 specimen (NHMB-F). – Egypt, El Arish, 21.VII.1933, WITTMER leg., 1 specimen (NHMB-F). – Egypt, W Natroun, Février, REITTER leg., 1 specimen (NHMB-F). – Egypt, Hadjar, ex coll. SCHUSTER, 1 specimen (NHMB-F). – Israel, Negev, Nizzana, 5.III.–29.VII.1993, M. MAHN leg., 1 specimen (SMNS). – Israel, Hadera, 27.I.1997, V. CHIKATUNOV leg., 2 specimens (TAU).

Distribution

Egypt, Israel.

Remarks

E. henoni was described by FAIRMAIRE (1897). REITTER (1904) described *E. peyerimhoffi* without knowing *E. henoni*. For PEYERIMHOFF (1907), the type comparison leads to a synonymy of *Eurycaulus peyerimhoffi* Reitter, 1904 with *E. henoni* Fairmaire, 1897. Contrary to that, KOCH (1935) specifies *E. henoni* and *E. peyerimhoffi* as separate species and notes that *E. peyerimhoffi* should be at least subspecifically different from *E. henoni*. According to KOCH (1935), in *E. peyerimhoffi* the lateral sides of the pronotum behind the apical angles bear dense, fine and sharp denticles, and the meso- and metatibiae are only weakly broadened towards the apex, their outer edge is straight or slightly concave. In *E. henoni*, however, the lateral sides of the pronotum are only irregularly, little dense crenulate, nearly smooth, never sharply denticulate, and the meso- and metatibiae are more or less broadened towards the apex, with their outer edges mostly very strongly convex. *E. henoni* was described from Ismailia and *E. peyerimhoffi* from the Sinai Peninsula. Accordingly, KOCH (1935) states *E. henoni* for Ismailia and *E. peyerimhoffi* for El Arish. SCHAWALLER (1993) and LILLIG & PAVLÍČEK (2003) follow the opinion of KOCH (1935). The examination of material both from Ismailia and El Arish reveals that the characters used by KOCH (1935) to distinguish the two taxa are variable both in specimens from Ismailia and El Arish. *E. peyerimhoffi* therefore is considered a synonym of *E. henoni*, as already proposed by PEYERIMHOFF (1907).

2.2 *Eurycaulus hirsutus* (Miller, 1861) (Figs. 1, 4, 6)

Material

Lectotype: Present designation: Aegypt., KINDRM. [handwritten] / Sammlung HAAG-RUTENBERG [printed] / *hirsutum* Miller, typ. [handwritten by HAAG-RUTENBERG] / Type [printed], *Scleron hirsutus* Mill. [handwritten] / Lectotypus, *Eurycaulus hirsutus* (Miller, 1861), R. GRIMM des. 2004 (ZSM).

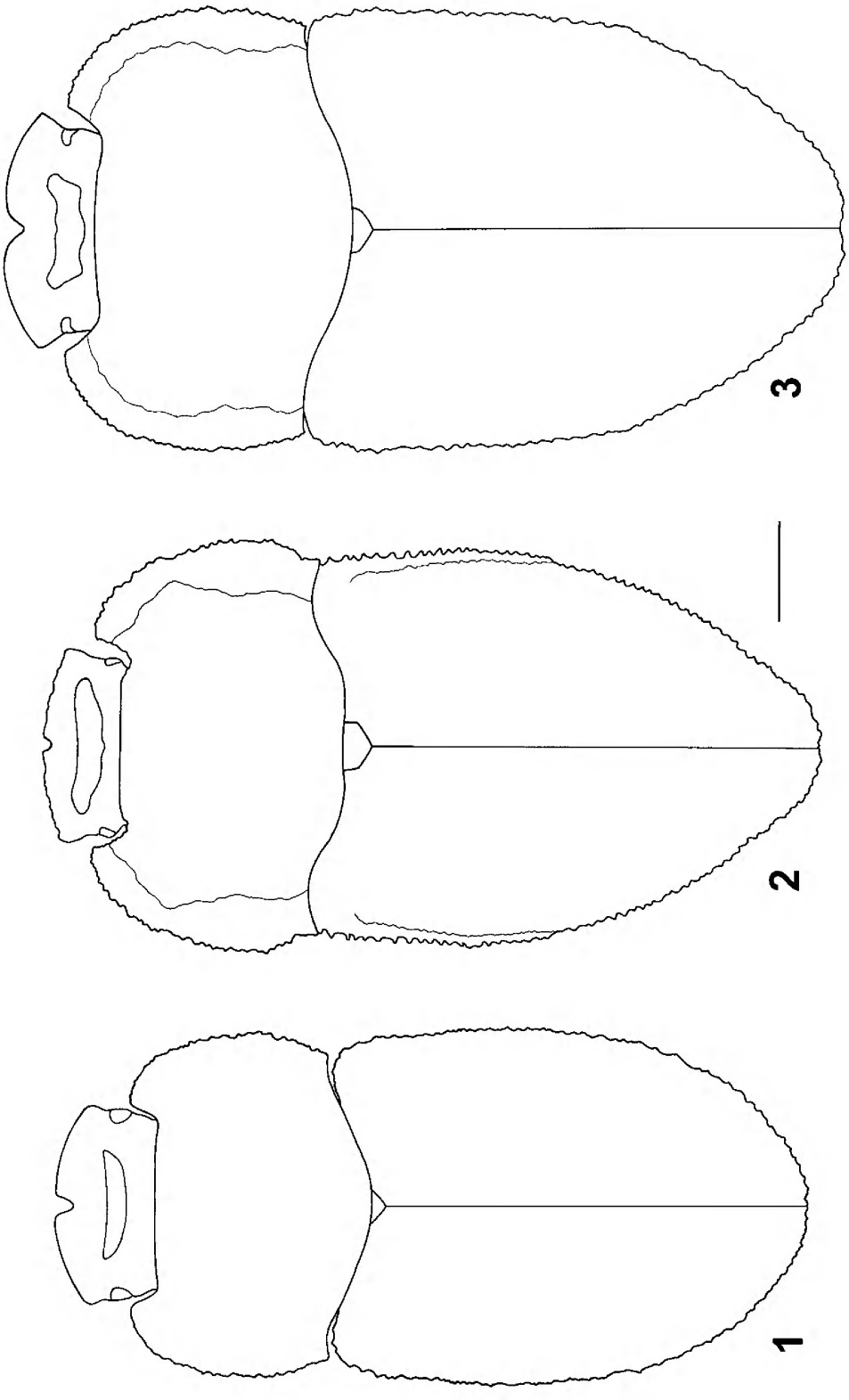
Further Material: Syria, KIND., ex coll. HAAG-RUTENBERG, 1 specimen (ZSM). – Egypt, PAGANETTI, ex coll. A. SCHUSTER, 2 specimens (ZSM). – Syria, ex coll. V. SEIDLITZ, 1 specimen (ZSM). – Egypt, Mokattam (Zitadelle), 17.III.1907, ex coll. ALFIERI, 1 specimen (NHMB-F). – Egypt, REITTER, ex coll. A. SCHUSTER, 1 specimen (NHMB-F). – Egypt, REITTER, ex coll. HAUSER, 1 specimen (NHMW). – Egypt, REITTER, 2 specimens (NHMW). – Egypt, Cairo, BOEHM, ex coll. A. SCHUSTER, 1 specimen (NHMB-F). – Egypt, Cairo, STAUDINGER, GASSNER, ex coll. A. SCHUSTER, 1 specimen (NHMB-F). – Egypt, Helouan, XI., BOEHM, ex coll. H. GEBIEN, 1 specimen (NHMB-F). – Egypt, Cairo, Wadi Tih near Turah, I., BOEHM, ex coll. H. GEBIEN, 1 specimen (NHMB-F). – Egypt, Cairo, BOEHM, ex coll. H. GEBIEN, 1 specimen (NHMB-F). – Egypt, Alag, 25.V.1913, ex coll. ALFIERI, 1 specimen (NHMB-F). – Egypt, Cairo, ex coll. J. DANIEL, 2 specimens (NHMB). – Egypt, WALTL, ex coll. HAAG-RUTENBERG, 1 specimen (ZSM). – Egypt, Wadi Hof, 18.I.1939, W. WITTMER leg., 1 specimen (NHMB). – Without further data, ex coll. LEDERER, 4 specimens (NHMW). – Without further data, ex coll. TÜRK, 1 specimen (NHMW). – 4 specimens ex coll. WALTL (NHMW), one of them with handwritten label by WALTL: Aegyptus, *Scleron contractu*. Wl.

Distribution

Egypt.

Remarks

E. hirsutus was described by MILLER (1861) as *Scleron hirsutum* from samples of the insect dealer KINDERMANN. According to HORN et al. (1990) the collection



Figs. 1–3. *Eurycaulus* spp., body shape. – **1.** *E. birsutus* Fairmaire. **2.** *E. schawalleri* n. sp. **3.** *E. lilligi* n. sp. – Scale: 1 mm.

MILLER is deposited in "Steiermärkisches Landesmuseum Joanneum Graz", but many types of Coleoptera also in "Naturhistorisches Museum in Wien". According to information from the colleagues Dr. K. ADLBAUER (Graz) and Dr. H. SCHÖNMANN (Vienna), neither in Graz nor in Vienna types of *E. hirsutus* are deposited. However, two specimens of *E. hirsutus* are deposited in ZSM, which are, according to their labels, from KINDERMANN. One specimen of these is labelled as type and is designated here as lectotype. The second specimen bears the labels "Syrien, KIND." [handwritten], "Sammlung HAAG-RUTENBERG" [printed] and "Cotypus, *Eurycaulus hirsutus* Mill." [handwritten] on a printed label with the inscription "Zoologische Staatssammlung". It was not possible to find out who added this third label. MILLER (1881) in the description of "*Scleron hirsutum*" indicates "Aus Aegypten [From Egypt]". Therefore, it is uncertain whether the specimen in question is part of the original type series, and likewise whether, according to our present knowledge, *E. hirsutus* is only found in Egypt. As a consequence the indication "Syrien [Syria]" probably was given erroneously.

KOCH (1935) described *E. hirsutus heliopolis* from Egypt. I have not seen any material of this subspecies.

2.3 *Eurycaulus schawalleri* **n. sp.** (Figs. 2, 5, 7)

Material

Holotype: ♂, Oman, Wahiba Sands, 21°38′N/59°18′E, 24.II.1986, M. GALLAGHER leg. (NHMB).

Paratypes: Same data as holotype, 15 specimens (NHMB), 5 specimens (SMNS), 3 specimens (RG). – Oman, Qarhat, Mu'ammar, 21°38′N/59°18′E, Camp, 130 m, 20.–25.II.1986, M. GALLAGHER leg., 1 specimen (NHMB). – Oman, 250 km S Nizwa, 100 km SE Ghaba Hotel, 15.III.1995, J. WITTMANN leg., 1 specimen (SMNS). – Oman, 250 km S Nizwa, 100 km SE Ghaba Hotel, 16.III.1995, J. WITTMANN leg., 1 specimen (SMNS). – Saudi Arabia, Eastern Province, Miskash, Al Udhailiyah, 12.II.1982, D. A. PITCHER leg., 1 specimen (ML), 2 specimens (MC). – Saudi Arabia, Eastern Province, Shedgum, 2.XI.1982, D. A. PITCHER leg., 1 specimen (MC).

Etymology

Named after Dr. WOLFGANG SCHAWALLER (Stuttgart), partner of long-term co-operation.

Diagnosis

Pronotum (Fig. 2) without any characteristic elevations and depressions, laterally broadly explanate; lateral sides just in front of basal angles shallowly emarginate, thus these angles are rectangular. Elytra highly convex, distinctly narrowed caudad; rows of punctures weakly impressed, second row with 20–23 punctures; interstice 1 and the alternate interstices rib-like elevated; lateral margin denticulate with long hairs, depressed in apical fifth, in dorsal view visible up to about middle. Protibia (Fig. 5) with outer edge bluntly protruded over the tarsal groove. Outer edges of posterior surface of meso- and metatibiae with small spine-bearing teeth; mesotibiae in front of the narrowed apex with a bigger tooth, posterior surface of metatibiae obliquely flattened inwards. Propleura longitudinally channel-like deepened. First and second abdominal sternites even in the middle.

Description

Black, moderately shining; length 5.6–6.5 mm, breadth 2.9–3.5 mm.

Head (Fig. 2) densely covered with high granulation, bearing short inclined setae; with a deep transverse depression, only partly granulate, and surface with distinct micro-reticulation. Vertex only with scattered granulation, with distinct micro-reticulation between granules.

Pronotum (Fig. 2) distinctly transverse, widest behind middle, covered with dense but isolated granules, with distinct micro-reticulation between granules; remarkably convex in lateral direction; disc near the finer and denser granulated longitudinal middle line slightly bump-like raised; laterally broadly explanate; anterior margin deeply emarginate, straight in middle and transversely bulge-like elevated; lateral sides rounded and just in front of basal angles shallowly emarginate, thus these angles are rectangular; apical angles broadly rounded; basal margin bisinuate, straight in middle.

Elytra (Fig. 2) highly convex, widest near base, narrowed caudad in a slightly convex curvature; rows of punctures weakly impressed, second row with 20–23 punctures, with a small bristle-bearing grain in front of each puncture; interstices with a row of likewise bristle-bearing, small grains; surface throughout with distinct micro-reticulation; interstice 1 and the alternate interstices rib-like elevated; lateral margin denticulate with long hairs, depressed in apical fifth, in dorsal view visible up to about middle.

Protibia (Fig. 5) broadly triangular, at apex broader than length of protarsus; apex of outer edge bluntly protruded over the tarsal groove. Outer edges of posterior surface of meso- and metatibiae with small spine-bearing teeth, inner sides with long hairs; mesotibiae in front of the narrowed apex with a bigger tooth, posterior surface of metatibiae obliquely flattened inwards.

Propleura longitudinally channel-like deepened. Metasternum in the middle of base with punctiform pit, first and second abdominal sternites even in the middle.

Aedeagus see Fig. 7.

Affinities

E. hirsutus Miller so far is the only known species of *Eurycaulus* with alternate rib-like elevated interstices. *E. hirsutus* is shallower than *E. schawalleri* n. sp., the pronotum slopes regularly to the lateral margin in *E. hirsutus* (Fig. 1), the sides are not explanate; in *E. schawalleri* n. sp. (Fig. 2) the disc is highly elevated and slopes steeply to the broadly explanate sides. The anterior margin of the pronotum in *E. hirsutus* is not transversely bulge-like elevated in the middle. The disc of the elytra in *E. hirsutus* is even between the elevated third interstices. In *E. schawalleri* n. sp. the first elevated interstices form the highest part, from there the elytra convexly slope to the lateral margin. The rows of punctures of the elytra in *E. hirsutus* are larger and more distinctly impressed than in *E. schawalleri* n. sp. The abdomen in *E. hirsutus* (Fig. 1) is less narrowed towards the apex than in *E. schawalleri* n. sp. (Fig. 2), and the outer edge of the protibia has no protuberance at the apex (Figs. 4, 5). In contrast to *E. hirsutus*, in *E. schawalleri* n. sp. the mesotibiae are distinguished by a bigger tooth in front of the narrowed apex. The parameres of both species are similarly shaped (Figs. 6, 7), in *E. schawalleri* n. sp. the apices of the parameres are more acute (Fig. 7).

2.4 *Eurycaulus lilligi* **n. sp.** (Fig. 3)

Material

Holotype: ♀, Kuwait, Mina-Al Zor, 28°44′N/48°22′E, 3 m, 9.III.1988, W. Büttiker leg. (NHMB).

Paratype: ♀, same data as holotype (SMNS).

Etymology

Named after the colleague Martin Lillig (Saarbrücken) for fruitful co-operation.

Diagnosis

Pronotum (Fig. 3) along the middle of disc keel-like elevated, near middle and behind the transversely bulge-like elevation in the middle of anterior margin and in front of posterior margin with shallow foveae; also with a longitudinal fovea in front of posterior margin opposite to the rib-like elevated fifth interstices of the elytra; sides broadly explanate; elytra (Fig. 3) highly convex, distinctly narrowed caudad; rows of punctures strongly impressed, second row with 16–17 punctures; interstice 1 and the alternate interstices rib-like elevated; lateral margin denticulate with short setae, in dorsal view completely visible. Protibia with apex of outer edge broadly rounded. Outer edges of posterior surface of meso- and metatibiae strongly spined; posterior surface of metatibiae evenly flattened. Propleura without depression. Metasternum, first and second abdominal sternites impressed in middle.

Description

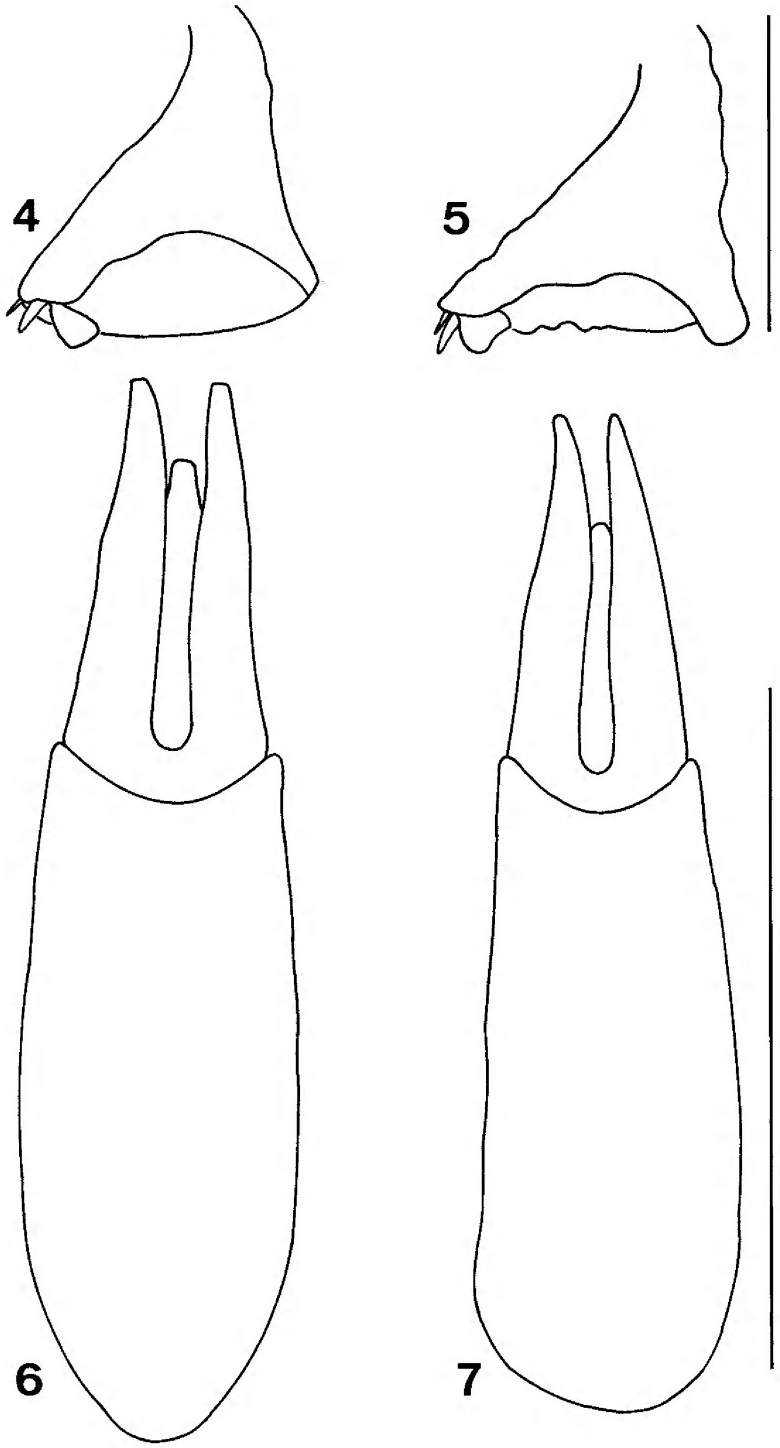
Black, moderately shining; length 6.6–7.0 mm, breadth 3.5–3.7 mm.

Head (Fig. 3) densely covered with high granulation, bearing short inclined setae; with a deep transverse depression, only partly granulate, and surface with distinct micro-reticulation. Vertex only with scattered granulation, with distinct micro-reticulation between granules.

Pronotum (Fig. 3) distinctly transverse, widest behind middle, lateral margin in dorsal view rounded from middle to apex and slightly convergent from middle to base; covered with dense but isolated granules, with distinct micro-reticulation between granules; remarkably convex in lateral direction; disc along the middle keel-like elevated, near middle and behind the transverse bulge-like elevation in the middle of anterior margin and in front of posterior margin with shallow foveae; also with a longitudinal fovea in front of posterior margin opposite to the rib-like elevated fifth interstices of the elytra; sides broadly explanate; anterior margin deeply emarginate, straight in middle, and with transverse, moderately bulge-like elevation; apical and basal angles obtuse; basal margin bisinuate.

Elytra (Fig. 3) highly convex, widest near base, narrowed caudad in a slightly convex curvature; rows of punctures strongly impressed, second row with 16–17 punctures, with a small bristle-bearing grain in front of each puncture; interstices with a spaced row of likewise bristle-bearing grains, distance between grains several times greater than their diameter; surface throughout with distinct micro-reticulation; interstice 1 and the alternate interstices rib-like elevated; lateral margin denticulate with short setae, in dorsal view completely visible.

Protibia broadly triangular, at apex broader than protarsus long; apex of outer edge broadly rounded. Outer edges of posterior surface of meso- and metatibiae



Figs. 4–7. *Eurycaulus* spp. – **4–5**. Protibia. – **4**. *E. hirsutus* Fairmaire. **5**. *E. schawalleri* n. sp. – **6–7**. Aedeagus. **6**. *E. hirsutus* Fairmaire. **7**. *E. schawalleri* n. sp. – Scales: 1 mm.

strongly spined, inner sides with long hairs; posterior surface of metatibiae evenly flattened.

Propleura without depression. Metasternum, first and second abdominal sternites impressed in middle.

Affinities

In *E. lilligi* n. sp. the alternate interstices are rib-like elevated as in *E. hirsutus* and *E. schawalleri* n. sp.

E. hirsutus differs from *E. lilligi* n. sp. by a more uniformly surface of the pronotum, without any characteristic elevations and depressions. The abdomen in *E. hirsutus* (Fig. 1) is less strongly narrowed caudad, the alternate interstices of the elytra are less elevated, and the hairs on lateral margin are much longer. Second row of punctures with 20–23 punctures (in *E. lilligi* n. sp. 16–17 punctures).

E. schawalleri n. sp. differs from *E. lilligi* n. sp. distinctly by the structure of surface of the pronotum. Moreover, in *E. schawalleri* n. sp. the alternate interstices of the elytra are less strongly elevated, in dorsal view the lateral margins of the elytra are only visible in the anterior part (Fig. 2), the punctures of the rows are smaller and less distinct, second row with 20–23 punctures (in *E. lilligi* n. sp. 16–17 punctures). Metasternum, first and second abdominal sternites without depressions in middle. Pro-, meso- and metatibiae are of different shape compared to *E. lilligi* n. sp.

3 Synonymy of the subgenera of *Eurycaulus* Fairmaire, 1868

The genus *Eurycaulus* was described by Fairmaire (1868). Reitter (1904) introduced the subgenus *Scleronimon*, and Koch (1935) the subgenus *Sclerenopsis*. Löbl & Merkl (2003) designated *E. granulatus* Reitter, 1904 as the type species of the subgenus *Scleronimon*. Medvedev (1974) added two new species of the genus *Eurycaulus* from Central Asia and Afghanistan, which, according to him, by their structure, occupy an intermediate position between the members of the subgenera *Eurycaulus* s. str. and *Scleronimon* Reitter. Grimm (2001) pointed out that *E. (Scleronimon) koestlini* Español & Viñolas, 1981 is a synonym of *Ammotrypes crenulicollis* Fairmaire, 1879, and consequently considered *Scleronimon* Reitter as synonymous with *Ammotrypes* Fairmaire, 1879.

According to Schawaller (1993), the separation into two (Reitter 1904) or three subgenera (Koch 1935) seems to be only a typological distinction and is not based on apomorphic characters. Bremer (2001) presupposes for a definition of genera that entities based on combinations of characters can be exactly defined and definitely separated from each other by existence or absence of these characters. This is also true for the definition of the subgenera. The characters which Reitter (1904) and Koch (1935) used to define the three subgenera do not fulfil this presuppositions, so that an adequate arrangement of new species is not always possible (cf. Medvedev 1974). Therefore it is proposed, to consider the subgenera *Ammotrypes* Fairmaire, 1879 (*Scleronimon* Reitter, 1904), and *Sclerenopsis* Koch, 1935 as synonyms of *Eurycaulus* Fairmare, 1868.

4 Checklist of the species of *Eurycaulus*

A checklist of the species of the genus *Eurycaulus* Fairmaire, 1868 was given by Schawaller (1993). Meanwhile some taxonomic changes in the genus *Eurycaulus* have been made, thus a revised list is given. Synonyms are indented.

E. buettikeri Schawaller, 1993	Oman
E. crenulicollis (Fairmaire, 1879)	Algeria, Tunisia
E. koestlini Español et Viñolas, 1981	
E. granulatus Reitter, 1904	Egypt
E. hellmanni Grimm, 2000	Algeria
E. henoni Fairmaire, 1897	Egypt, Israel
E. peyerimhoffi Reitter, 1904	
E. hirsutus (Miller, 1861)	Egypt
E. hirsutus heliopolis Koch, 1935	Egypt
E. kabakovi Medvedev, 1974	Afghanistan
E. lilligi n. sp.	Kuwait
E. marmottani Fairmaire, 1868	Algeria, Tunisia, Libya
E. nasreddinovi Medvedev, 1974	Tajikistan
E. pachecoi Escalera, 1943	Western Sahara
E. quedenfeldti Heyden, 1890	Algeria, Libya
E. reymondi Español, 1951	Morocco, Algeria
E. schawalleri n. sp.	Saudi Arabia, Oman

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